CLAIMS:

1. A method for cooling a microelectronic complex including a plurality of discrete functional modules, said method comprising:
   a) during operation of the microelectronic complex, dynamically assessing a cooling requirement of each discrete functional module;
   b) cooling the discrete functional modules independently from one another on the basis of the cooling requirements assessed at a.

2. A method as defined in claim 1, wherein the microelectronic complex is formed on a unitary body of semiconductor material.

3. A method as defined in claim 2, wherein in operation the microelectronic complex utilizes signals associated with respective ones of said plurality of discrete functional modules, each signal containing information allowing to determine the cooling requirement of the respective discrete functional module, said method including:
   a) computing an amount of cooling required by a particular discrete functional module on the basis of the signal associated with the particular discrete functional module;
   b) cooling the particular discrete functional module on the basis of the amount of cooling computed at a.

4. A method as defined in claim 3, wherein computing an amount of cooling required by a particular discrete functional module includes determining an amount of heat generated by the particular discrete functional module.

5. A method as defined in claim 4, wherein said signals are electric signals.

6. A method as defined in claim 5, wherein said signals are voltage signals.

7. A method as defined in claim 5, wherein said signals are current signals.

8. A method as defined in claim 4, wherein said signals are optical signals.

9. A method as defined in claim 3, wherein computing the amount of cooling required by a particular discrete functional module includes determining a temperature of the particular discrete functional module.

10. A method as defined in claim 2, wherein assessing the cooling requirement of a particular discrete functional module includes monitoring a temperature differential between the particular discrete functional module and at least one other discrete functional module of said plurality of discrete functional modules.

11. A method as defined in claim 10, wherein monitoring the temperature differential between the particular discrete functional module and at least one other discrete functional module includes tracking the temperature of the at least one other discrete functional module.

12. A method as defined in claim 11, wherein cooling a particular discrete functional module includes adjusting the temperature of the particular discrete functional module to substantially match the tracked temperature of the at least one other discrete functional module.

13. A method as defined in claim 10, wherein the at least one other discrete functional module is adjacent the particular discrete functional module on said body of unitary semiconductor material.

14. A method as defined in claim 2, wherein assessing the cooling requirement of a particular discrete functional module includes monitoring a differential between an amount of heat generated by the particular discrete functional

module and an amount of heat generated by at least one other discrete functional module of said plurality of discrete functional modules.

15. A method as defined in claim 14, wherein the differential between the amount of heat generated by the particular discrete functional module and the amount of heat generated by the at least one other discrete functional module of said plurality of discrete functional modules is assessed using a measurement of a differential between a current entering the particular discrete functional module and a current entering the at least one other discrete functional module.

16. A method as defined in claim 15, wherein the differential between the current entering the particular discrete functional module and the current entering the at least one other discrete functional module is assessed using a differential current measurement sensor connected between the particular discrete functional module and the at least one other discrete functional module.

17. A method as defined in claim 2, wherein cooling the discrete functional modules independently from one another includes the step of independently controlling cooling modules in a thermal exchange relationship with respective ones of the plurality of discrete functional modules.

18. A cooling device for a microelectronic complex including a plurality of discrete functional modules, said cooling device comprising:

a) a plurality of independent cooling modules, each cooling module being adapted to establish a thermal exchange relationship with a respective one of the plurality of discrete functional modules;

b) control logic for dynamically assessing a cooling requirement of each discrete functional module during operation of the microelectronic complex, said control logic operative to adjust an amount of cooling provided by each cooling module to the respective discrete functional

module on a basis of the assessed cooling requirement of the respective discrete functional module.

19. A cooling device as defined in claim 18, wherein each cooling module is capable to operate within a range of cooling levels, from a predetermined minimum cooling level to a predetermined maximum cooling level, said control logic being operative to dynamically adjust the cooling level of a particular cooling module on the basis of the assessed cooling requirement of the respective discrete functional module.

20. A cooling device as defined in claim 18, wherein the assessment includes the determination of an amount of cooling required by each discrete functional module.

21. A cooling device as defined in claim 18, wherein said control logic is distributed among the plurality of cooling modules, whereby each cooling module includes local control logic.

22. A cooling device as defined in claim 18, wherein said control logic is distributed among the plurality of discrete functional modules, whereby each discrete functional module includes local control logic.

23. A cooling device as defined in claim 18, wherein said control logic is centralized for the plurality of cooling modules, whereby said cooling device includes a single control logic unit for controlling the operation of said plurality of independent cooling modules.

24. A cooling device as defined in claim 18, wherein each cooling module is a thermo-electric cooler.

25. A cooling device as defined in claim 18, comprising a plurality of current

differential measurement sensors connected between adjacent discrete functional modules for assessing a current differential between the adjacent discrete functional modules.

26. In combination:

a) a microelectronic complex including a plurality of discrete functional modules;

b) a cooling device including:

i) a plurality of independent cooling modules, each cooling module in a thermal exchange relationship with a respective one of said plurality of discrete functional modules;

ii) control logic for dynamically assessing a cooling requirement of each discrete functional module during operation of said microelectronic complex, said control logic operative to adjust an amount of cooling provided by each cooling module on a basis of the assessed cooling requirements.